

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

HERBACEOUS WIND BARRIERS

(feet)
CODE 422A

DEFINITION

Herbaceous vegetation established in rows or narrow strips across the prevailing wind direction.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion from wind.
- Protect growing crops from damage by wind-borne soil particles.
- Manage snow to increase plant available moisture.
- Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland, other land where crops are grown or land where protective cover cannot be maintained.

This standard includes the location of herbaceous wind barriers and their management for identified uses. Criteria for the establishment of perennial herbaceous vegetation are in practice standards for establishing permanent vegetation, or in other places in the Field Office Technical Guide.

CRITERIA

General Criteria Applicable To All Purposes Named Above

Vegetation:

Barriers may consist of perennial or annual plants, growing or dead. Plant materials shall be selected for the following characteristics:

- Adaptation to the site.

- Erect non-spreading growth habit.
- Resistant to lodging.
- Good leaf retention.
- Minimum competition with adjacent crops.
- Compatible with adjacent crops.

Number of Rows

Barriers may consist of one row of plants, providing the required porosity can be achieved with a single row, and that the row contains no gaps.

Where two or more rows are required to achieve the required porosity and to avoid gaps, the rows shall be spaced no more than 36 inches apart.

Additional Criteria To Reduce Soil Erosion from Wind

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during the wind erosion period for which the barriers are designed.

Barrier Porosity

Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent.

Barrier Direction and Spacing:

When barrier direction deviates from perpendicular to the prevailing wind erosion direction, the spacing between barriers shall be correspondingly reduced.

The spacing between barriers shall be measured along the prevailing wind erosion direction during those periods when wind erosion is expected to occur. Spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the soil loss tolerance (T), or other planned soil loss objective.

The effective spacing between barriers shall be determined using current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Protect Growing Crops From Damage From Wind-borne Soil Particles

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 2 feet during those periods when growing crops are susceptible to damage by wind-borne soil particles.

Barrier Porosity

Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent during the period when growing crops are to be protected.

Barrier Direction and Spacing

When barrier direction deviates from perpendicular to the prevailing wind erosion direction, the spacing between barriers shall be correspondingly reduced.

The spacing between barriers shall be measured along the prevailing wind erosion direction during those periods when crops are susceptible to damage by wind-borne soil particles. Spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the crop tolerance to wind erosion¹ as specified in applicable Field Office Technical Guide, other accepted technical references, or other planned crop protection objective.

The spacing between barriers shall be determined using current approved wind erosion prediction technology to estimate wind erosion during specific management periods. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Manage Snow To Retain Additional Soil Moisture

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during periods of expected snow cover.

Barrier Porosity

Barriers established for this purpose shall be designed to achieve a porosity of 60-75 percent during periods of expected snow cover.

Barrier Direction and Spacing:

When barrier direction deviates from perpendicular to the prevailing wind direction, the spacing between barriers shall be correspondingly reduced.

The effective spacing shall be measured along the direction of prevailing winds during periods of expected snow cover. For uniform distribution of drifting snow, spacing shall not exceed 12 times the expected height of the barrier.

Additional Criteria To Provide Food and Cover For Wildlife

Vegetation

Barriers established for this purpose shall consist of plants that provide food and cover for the targeted wildlife species.

Barrier Width

Barriers established for this purpose shall have a minimum width of two feet.

Barrier Height

Barriers established for this purpose shall have a minimum expected height that provides adequate cover for the targeted wildlife species.

¹Crop tolerance to wind erosion is the maximum rate of soil blowing that crop plants can tolerate without significant damage due to abrasion, burial, or desiccation or reduction in crop yield or quality.

CONSIDERATIONS

Transport of wind-borne sediment and sediment-borne contaminants offsite are reduced by this practice when used in a conservation management system.

Herbaceous wind barriers are more suitable than field windbreaks for use under center pivot irrigation systems due to height considerations. Windbreaks may be located outside the windward edge of the circle.

Spacing between barriers may be adjusted, within the limits of the criteria above, to accommodate widths of farm equipment to minimize partial or incomplete passes.

Selection of plants for use in barriers should favor species or varieties tolerant to herbicides used on adjacent crops.

Plants, which may be alternate hosts for pests injurious to adjacent crops, should not be used.

Selection of plant species less palatable to animals may reduce damage to barriers from grazing wildlife.

Where water erosion from melting snow accumulated within the barrier system is a concern the hazard can be reduced by supporting erosion control practices such as residue management. Where feasible, aligning barriers across the slope can enhance moisture infiltration and reduce erosion.

When barriers are designed to enhance wildlife habitat, plant species diversity should be encouraged. The use of evergreens in barriers designed to provide winter cover might increase their value. Barriers that result in multiple structural levels of vegetation within the barrier will maximize wildlife use.

Some plants are damaged by blowing wind as well as by wind-borne soil particles. In such cases, the spacing between wind barriers may have to be reduced from that obtained using wind erosion prediction technology.

Water Quantity

1. Effects on the components of the water budget, especially on volumes and rates of runoff and infiltration.
2. Effects on downstream flows or aquifers that would affect other water uses or users.

Water Quality

1. Effects on erosion and the movement of sediment, oxygen demanding materials and soluble and sediment-attached substances carried by runoff.
2. Effects on the movement of dissolved substances to ground water.
3. Effects on the quality of downstream water that could cause undesired effects on aquatic and wildlife communities.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NCR's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species.

If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Specifications for establishment and maintenance of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation & Maintenance described in this standard.

Specifications shall be recorded using approved specification sheets, job sheets, or other acceptable documentation.

OPERATION AND MAINTENANCE

Annual barriers shall be reestablished each year by planting at recommended dates, leaving rows standing after crop harvest, or leaving standing strips when incorporating a cover crop into the soil.

After establishment, perennial barriers shall be fertilized at the same time and rate as adjacent field crops, or as needed. Weeds shall be controlled with cultivation, mowing, chemicals, or other acceptable methods.

Harvest of hay or seed from perennial barriers, grazing or mowing for weed control shall be managed to allow re-growth to the planned height before periods when wind erosion, crop damage, or drifting snow are expected to occur.

Annual barriers may be grazed or harvested after critical wind periods have passed.

Wind-borne sediment accumulated in barriers shall be removed and distributed over the surface of the field as determined appropriate.

Barriers shall be re-established or relocated as needed.

Barriers designed to enhance wildlife habitat should not be mowed or pruned unless their height or width exceeds that required to achieve the wildlife objective, and they become competitive with the adjoining land use. When mowing or pruning is necessary, it shall be done during the non-nesting season.